CLAIMS

1. A magnetic read head comprising:

a current perpendicular to the planes (CPP) sensor;

the CPP sensor having a top cap layer structure; and

the cap layer structure being composed of ruthenium (Ru) or rhodium (Rh).

2. A magnetic read head as claimed in claim 1 wherein the material of the cap layer structure is ruthenium (Ru).

3. A magnetic read head as claimed in claim 1 wherein the material of the cap layer structure is rhodium (Rh).

4. A magnetic read head as claimed in claim 1 wherein the CPP sensor further comprises:

a ferromagnetic pinned layer structure;

a ferromagnetic free layer structure;

a nonmagnetic spacer layer located between the pinned layer structure and the free layer structure.

5. A magnetic read head as claimed in claim 4 further comprising:

ferromagnetic first and second shield layers;

the CPP sensor being located between the first and second shield layers; and

the first and second shield layers serving as first and second leads for conducting a current through the CPP sensor in a direction perpendicular to major thin film planes of the CPP sensor.

6. A magnetic read head as claimed in claim 5 wherein the material of the cap layer structure is ruthenium (Ru).

7. A magnetic read head as claimed in claim 6 wherein the free layer structure is located between the spacer layer and the cap layer structure.

8. A magnetic read head as claimed in claim 6 wherein the pinned layer structure is located between the spacer layer and the cap layer structure.

9. A magnetic read head as claimed in claim 5 wherein the material of the cap layer structure is rhodium (Rh).

10. A magnetic read head as claimed in claim 9 wherein the free layer structure is located between the spacer layer and the cap layer structure.

11. A magnetic read head as claimed in claim 10 wherein the pinned layer structure is located between the spacer layer and the cap layer structure.

12. A magnetic head assembly comprising:

a write head;

a read head adjacent the write head;

the read head comprising:

a current perpendicular to the planes (CPP) sensor;

the CPP sensor having a top cap layer structure; and

the cap layer structure being composed of ruthenium (Ru) or rhodium (Rh).

13. A magnetic head assembly as claimed in claim 12 wherein the CPP sensor further comprises:

a ferromagnetic pinned layer structure;

a ferromagnetic free layer structure;

a nonmagnetic spacer layer located between the pinned layer structure and the free layer structure.

14. A magnetic head assembly as claimed in claim 13 further comprising:

ferromagnetic first and second shield layers;

the CPP sensor being located between the first and second shield layers; and

the first and second shield layers serving as first and second leads for conducting a current through the CPP sensor in a direction perpendicular to major thin film planes of the CPP sensor.

15. A magnetic head assembly as claimed in claim 14 wherein the material of the cap layer structure is ruthenium (Ru).

16. A magnetic head assembly as claimed in claim 14 wherein the material of the cap layer structure is rhodium (Rh).

17. A magnetic disk drive comprising:

at least one magnetic head assembly that has a head surface;

the magnetic head assembly having a write head and a read head;

the read head including:

a current perpendicular to the planes (CPP) sensor;

the CPP sensor having a top cap layer structure; and

the cap layer structure being composed of ruthenium (Ru) or rhodium (Rh);

ferromagnetic first and second shield layers; and

the CPP sensor being located between the first and second shield layers;

a housing;

a magnetic medium supported in the housing;

a support mounted in the housing for supporting the magnetic head assembly with said head surface facing the magnetic medium so that the magnetic head assembly is in a transducing relationship with the magnetic medium;

a motor for moving the magnetic medium; and

a processor connected to the magnetic head assembly and to the motor for exchanging signals with the magnetic head assembly and for controlling movement of the magnetic medium.

18. A magnetic disk drive as claimed in claim 17 wherein the CPP sensor further comprises:

a ferromagnetic pinned layer structure;

a ferromagnetic free layer structure;

a nonmagnetic spacer layer located between the pinned layer structure and the free layer structure.

19. A magnetic disk drive as claimed in claim 18 wherein the material of the cap layer structure is ruthenium (Ru).

20. A magnetic disk drive as claimed in claim 18 wherein the material of the cap layer structure is rhodium (Rh).

21. A magnetic read head comprising:

a current perpendicular to the planes (CPP) sensor;

the CPP sensor having a top cap layer structure which includes:

a first layer of tantulum (Ta) only;

a second layer of ruthenium (Ru), rhodium (Rh) or gold (Au); and

the first layer being located between and interfacing a spacer layer and the second layer.

22. A magnetic read head as claimed in claim 21 wherein the second layer is ruthenium (Ru).

23. A magnetic read head as claimed in claim 21 wherein the second layer is rhodium (Rh).

24. A magnetic read head as claimed in claim 21 wherein the second layer is gold (Au).

25. A method of making a read head with a current perpendicular to the planes (CPP) sensor comprising the steps of:

providing a sputtering chamber with a vacuum;

sputtering within the chamber a cap layer structure of the CPP sensor wherein the cap layer structure has a first layer of tantalum (Ta) and a second layer selected from the group consisting of ruthenium (Ru), rhodium (Rh) or gold (Au);

the first layer being sputtered in the chamber with said vacuum; and

the second layer being sputtered in the chamber on the first layer without breaking said vacuum.

26. A method as claimed in claim 25 wherein the second layer is formed of ruthenium (Ru).

27. A method as claimed in claim 25 wherein the second layer is formed of rhodium (Rh).

28. A method as claimed in claim 25 wherein the second layer is formed of gold (Au).